REPORT - 8 DEC 1982

SPEAKER #1: Regarding the report dated 8 December 1982, this seems to be an overview of activities that take place within this building or institute or whatever it is. And it seems to cover two types of activities. The first, besides the scientific activities, one seems to a record keeping facility and just some sort of record keeping. It's not clear from the first one, what exactly it is. But then there are indications, particularly from the drawings, drawing #4 looks like a projection of a, and also going on the description from the text, a projection of a circuitry path traced on a, a semi-conducting substrate or silicon, substrate and I'll refer to this later and subsequent reports. The drawing on page #5 there, at first I thought it looked like a hook up of various leads into some micro processor or other electronic device for testing. But in subsequent reading, I think may be instead some sort of strain testing mechanism, so we may be

talking about two different activities, one related to electronic, miniaturized electronic chips and another one to more basic testing of, of the performance of a material, in terms of its physical properties.

SPEAKER #1: With regard to what the nature of the material might be, it's important to remember that semi-conducting materials aren't normally elemental, pure elemental materials, for instance, when you talk about silicon being a substrate for a microelectronic chip and something like that, you are talking about pure silicon but whether it's considered a metal or ceramic is a moot point. It's actually a metaloid or semi-metalic type of material, all right. It has conducting properties, but it does not have many of the physical properties of metal. It's, for instance, very brittle. Pure silicon is very, is very light, gray, metallic shiny, but very brittle material. Now, when many times you alter the properties of those materials by introducing a very low level impurity, a doping and you can do that in a variety of methods. Some could be thermal

methods, like you could mix them together and heat them up or there's a whole wide variety. You know, you could conceivably implant impurities within a material, with an ionic beam. There's also some different ways of doing it. And there may be some of that going on here.

SPEAKER #1: This reference to the report of 6 Jan 1983, there is very little that I got out of this, just some references to, it sounds like it could be chemical operations taking place, but there's really not too much that I can draw from. This particular report just sounds like an institute where, well, as described in report both training and research is taking place and that's common, in all my experience has been that those are common activities in a research institute, both training and original research.

SPEAKER #1: All right, with reference to the report dated 12 January 1983, the reference to data storage on fold out sheets and the drawing of the sheets, suggest a couple possibilities. The drawings of the sheets showing connections of various lines. These could be, for instance, passed to

various decision points to various tests in a decisiontry and kind of mapping out a, an experimental plan and they could, numbers (mumble) and could report the results of the measurements made at those different points. The other possibility is that they could be schematic representations of pathways by sub-atomic particles through a material and by some means a measurement was made as pathways change, perhaps the density of whatever deflected the particle that was moving or some sort of estimate of its size or its other properties at that point. The last thing it possibly could be, it just comes from the fact that it looks like could be a crystaline material, with a bunch of grain boundaries and measurements are made at the junction of grain boundaries. Measurements like that would refer to the purity of the material, the presence of impurities at grain boundaries, where they normally tend to gather in a polycrystine material. Those are three possibilities of what that could represent.

SPEAKER #1: The second picture is, as I said before, looks for all the world, like particle tracks in a

cloud chamber and this, going back to the test, refers to measurements made and recorded on that previous sheet on drawing #1. This could go back to what we were talking about before, about a, beam or more single particle, either a beam of particles or single particles fired into a material and the tracks left by it as it passes through the material. Now this could just be to determine the properties of the material, that's the target material, or it could be an effort to doping that material in various, very precise positions within its crystaline lattice or its structure with impurities or dopents.

SPEAKER #1: With regard to the report dated 18 January 1983, there's a description of plastics sheets with drawings on then. And the fact that several colors were used to make the different tracks on each sheet and that they were placed together. This, to me, sounds like a good way to construct on a size observable by someone doing testing or just trying to put together a conceptual model of it. A representations of a stack of semi-conductor or electronic sub-strates, upon which various circuitry paths have been traced.

You see, the impression I get from this is that what is being constructed here is very densely packed, microelectronic chips, rather than just having a chips circuitry traced out on a single, should be possible to trace out circuitry on one layer, and then take another chip and put it on top and then be able to bore through and you'd wind up doing this with laser beams or something like that, very small size. And be able to stack a whole bunch of these on top of each other, so instead of just having a chip of just two dimensions on a substrate, you combine the two and actually build a three dimensional, although very small chip and then you can, once the magnitude increased the density of circuitry that you could put together on the same little, itty, bitty thing. And by tracing out the circuit pathways on these plastic sheets and then stacking, you get a feeling, you know, for somebody trying to design these things, how they would all fit together, that would certainly be helpful in trying to conceptualize how to cut the pad on each individual layer and how they would be fitted together.

SPEAKER #2: So you think this is a, could possibly be a either a research and development, fabrication facility or--)

SPEAKER #1: Well, since they're doing all sorts of comparisons here and fitting them, it's like they're trying to invent the chip, they're trying to put it together. They have an idea of what they want and they're trying to make a prototype out of it.

SPEAKER #2: Okay, well now let me ask this. Could they also ge reverse engineering, taking the chip that they've gotten somewhere else, and taking it apart, is there any indication, so far, in what you've read, that they're doing that?

SPEAKER #1: Well, yeah, yeah, you could just as easily do it the opposite way, particularly if you're paying so much attention looking at something here, looking at each layer, you could be, for instance, taking, stripping away a little section, taking a look at it, tracing out what it was, stripping away the next section, tracing

it out, and then after you've done that, you take all the tracings that you've made on these plastic sheets. And now you know what each layer is and you can then put it back together, see how it was made or what function it performed, again, I'm just speaking, you know, in general terms, since I don't know how all things are put together, but I know the basic concept behind that. Yeah, it could be, yeah, it's an equal possibility, particularly considering what we saw in the other, previously mentioned report, in this case, the report was the one dated 8 December 1982, where is a projection of, what looked to me like a circuit pattern on an electronic chip. so,..yeah it could be, you could be just peeling one of these things apart, layer by layer. I know conceptually it's possible to put together devices like that, I don't know whether they really are or not, that certainly would be a way of taking them apart.

SPEAKER #1: There are other references in the same 18 January 1983 report to spinning materials. By spinning, I mean creating a sample, like a beat

or a fiberbine, by melting in SLINE and getting something to come off it, but it's really not clear exactly what this might be. There's reference to substances being added, these could be dopents, for instance, but that fact that there's not reference here to any high temperature possessing, makes me wonder exactly whether this makes sense. Whether you can add these dopents at room temperature under ambient conditions, maybe you can, because one reference is made to the fact that the material seems plastic. Now the question is, is that plastic like you're accustom to handling, a plastic telephone, it that plastic mean it's moldable. I get the impression from their discussion that they're talking about something like a an organic piece of matter like a telephone receiver, something like that. Now, if that was the case, that could refer to, like we were talking about before, silicon. If someone gave you a sheet of silicon and you didn't know what it was, you'd say "oh, that's a, that's a piece of plastic, because it feels like plastic, it's light like plastic and it's got a luster that's

common t[illegible]styrene or something like that. You wouldn't know unless I told you. You could snap it and it would snap like plastic, but it would really be elemental silicon.

SPEAKER #2: What is the key element you need to know that's not in there, right now, as far as that spinning process?

SPEAKER #1: Well, is it done at room temperature or, for instance this could be a way for making amorphous metals, you know. Where, what happens is, is you--

SPEAKER #2: --Like metal glass?

SPEAKER #1: Yeah metal glasses, yeah, what happens there, one way of making it, is by having a molten bath of material and having a wheel that dips into that molten bath (mumble) at extremely high temperatures and having the molten bath fluid enough so that wheel just scoops out the thinnest layer of all and immediately slings it out to the open air, on to cool chamber. And doing that it quenches so quickly that it

maintains its amorphous state and never crystalizes. That could be what's going on here. And in that case, the only high temperature part is in that bath part, but the whole collection area, you know, you need enough room to collect that stuff for it to quench, being thrown out to the air like that. That would all be done, that would all be at room temperature. As a matter of fact, you don't want hot there, all you want is to cool, so that the stuff quenches quickly. So that could be what's going on, but why the material, or how the material is being spun would be a good thing to know. Is there a hot end at one end and then is all the rest of the operation being used to collect, to quench whatever material may be spun. This is just a guess at what that could be.

SPEAKER #2: What do you think this white pen is?

SPEAKER #1: I don't know. The way they describe it.

SPEAKER #2: How about some of the drawings in here, could we discuss--

SPEAKER #1: Yeah, there's drawings that make reference to the pen.

SPEAKER #2: Okay, how about an electron microscope, could that by chance be a symbolic description of an electron microscope?

SPEAKER #1: Well, (delete), not the way it's being described being used here. Sounds as if this pen is like a wand. An electron microscope really is a very large instrument. The only way an electron beam could travel is in a perfect vacuum or very close to a vacuum. So that means usually the column in which the beam is propagated is (Mumble) not only that you use magnetic lenses to focus that beam, cause normally an electron beam's pretty diffuse and has to be focussed on an area. This sounds like a wand. Now the only thing that could produce something like that, in my mind, would be, it could either be, again, a beam of light, coherent light or incoherent light, for instance, it could be a laser beam. But the impression I get is that, that this beam only extends a certain distance. It does not

continue until it impinges on something, it's like it sticks out a foot or something like that. Although that's not for sure, it would be interesting to know whether the beam continues until it impinges or whether it just has a certain length. If it only has a certain length, then it makes me think that it's, well, like a plasma jet or something like that. Although, those are usually very difficult to generate too. Sounds like a little blow torch or butane torch or something like that. But, a plasma is very difficult to generate--

SPEAKER #2: Could that be used in testing the density or heat, fix the hest on--?

SPEAKER #1: I don't know, it could be. It's hard for me to, I really can't figure out what that thing is doing there. It really doesn't make any sense to me at all.

SPEAKER #2: Okay.

SPEAKER #1: The blueprint drawings, I think are very--

SPEAKER #2: (Drawing #5?

SPEAKER #1: Yeah, drawing #5, in this case, is titled blueprint area. That and drawing #6. The patterns there and on page #7 and the junctions look for all the world to me like all the pictures I've ever seen of the circuit patterns traced on a semi-conductor wafer, silicon wafer or something like that.

SPEAKER #2: What could those be used for, anything or are they used for computers?----

SPEAKER #1: Yeah, computers, ah...sure. You know, you design the chip to do it and all the devices are built into the chip, because the devices themselves are composed of the materials that make up the chips.

SPEAKER #2: What would you need to know about those drawings here to find out what function that particular drawing did, like a (knowledge) (?), an opening and closing or relay or whatever?

SPEAKER #1: I wouldn't be able to, because I really don't electronics. You need somebody who would have

to be able to decipher that stuff. And he would have to know, you know, what the various little devices are that are on it.

SPEAKER #2: But if he could get the description, a lot of items as I understand, they (mumble), they mean whoever frabricates microchips. What each layer that chip does, like you got a knowledge circuit, you got logic circuit, you got a, I don't know, but there, it's is a different circuit has differnet functions, a lot of times it will be (LABELED)(?).

SPEAKER #1: Yeah, it could be. But I just know what they look like, I can't interpret them at all.

SPEAKER #2: What about this one?

SPEAKER #1: All right, which one? All right, this drawing #3, I can't make head nor tail out of it.

SPEAKER #2: How about #2?

SPEAKER #1: All right, #2, this is supposed to be a representation of, I believe, the materials that

come out that spinning operation. And it could indicate whether the material truly came out as an amorphous material or whether the stuff that was spun came out with a crystaline pattern. Amorphous materials will not have any crystal structure, but they can have grain boundaries. They can, you know, they can freeze into little pieces.

SPEAKER #2: (where they got labeled here, very tiny nodules, surrounded crystals, would that in fact not be crystal, it would be amorphous?)

SPEAKER #1: Oh, it could be amorphous, yeah.

SPEAKER #2: Aren't crystals normally round?

SPEAKER #1: Well, well, it's hard to say, it could depend on the magnification. Something could look round if it was very low magnification and blown up high enough, you could see that it had the cleavage lines and the characteristic crystallographic axis that indicated as crystaline material. Like I said, it's often times a matter of magnification.

SPEAKER #2: What do you think this drawing #1 is, in the white room?

SPEAKER #1: Yeah.

SPEAKER #2: What do you think that is just out of curiosity?

SPEAKER #1: I don't know, it just looks like samples stacked up for some sort of, for the handling. Ah, I mean, hang on a second. Now, well, it's hard to say, for instance, you could stack up, it says there's layers, squares of layers, somewhere between metallic and plastic. For instance, what you could do, is when sometimes when you grow silicon, single crystal silicon, you wind up growing a large piece called a boule or something like that. Usually it grows and it's like a giant cucumber, just grows and from that, wafers are cut layer by layer. And then if you further cut them up, you might mount them in something like this for, for some production technique, where you need them lined up. But, you know, I'm just guessing. It's really hard to say what that might be.

SPEAKER #1: All right the description in the report dated 19 January 1983, it goes back to the general reference made in the original report on 8 December 1982, to the second portion where they're talking about some material with spider legs coming out of it. When I first saw that in the 8 December report, I thought it was conductor lines hooked up to some electronic device, you know, some microprocessor chip or something like that for testing. But then as you go through this description here, it sounds an awful lot like they are testing some material for its strength properties. What it sounds like their doing, is that they've got a whole bunch of different compositions and they're periodically doping this composition, they're putting in different amounts, you know, in a very precise manner, 1/10 of one percent in this one, 2/10 of on percent in the next one, all the way through the line and then from the description of the processing unit sounds like that they're then firing that or heating that up at various temperatures. So they got different compositions they're testing and then all those

compositions at different temperatures. And that sounds like they put together two of these and fired it together with this metal grid inside, which sounds to me like some sort of strain gage, right? And then, but it could be, for instance, a piezoelectric strain gage or these could be piezoelectric devices that they're testing. And those are just devices that will transmit a current or potential based on physical defirmation and that's what sounds like they're testing here. And from the number of items being put together in terms of compositions and various colors given to these things which I interpret as different temperatures because, sure enough, you could heat something up to white hot down to cherry red. Those are common terms used in high temperature. It's a ball park figure of how hot it is. That could be what is going on there. Now, it's not clear to me how these things are put together later. Sure looks, when these things are put together with the wire mesh, I'm referring now to drawing #3, it looks like something put together for strain testing, in compression or tension. But how these things

are put together, there's a first pattern there and a second pattern. I have no idea what that might represent, unless these little pieces are really not test pieces but actual final shapes, which would be put together in some sort of pattern.

SPEAKER #1: The following page, page #4, that looks, that might be taking this same material and putting, forming it into an irregular shape and seeing how well it withstands impact, at various points--

SPEAKER #2: Kinetic energy type impacts, do you think? Well, it looks to me like a kinetic energy.

SPEAKER #1: Yeah, it could be kinetic energy or, yeah, sure, that could be it. You know, that when I see those discs put together in a network back on page #3, it makes me think of the shapes that are used to put together in a mixed matrix array for armor purposes and that could be how those things, for instance, you might decide to, just as speculation, might decide to, besides testing this way, this may actually be put together with

those wires there for, to be tied together and held together in a, like chicken wire, upon which then you forged metal, molten metal, you know, poured it right on top and those wires would hold everything, all the little discs into place until the casting was complete. That's a completely different possibility. But it could be, you know. So that's what that could be, and I really can't make any estimation about what #5 or #6 is, they're just building shapes.

SPEAKER #1: Then finally the report dated 17 February 1983, just makes references to general buildings that really have no meaning to me. So it sounds to me like there's two different activities going on here. Something that sure sounds like a very densely packed electronic chip manufacture or, as you say, could be taking one of those babies apart. And it would be easy enough to take them a part, I think. You could ion, mill off layer by layer very easily and then take a look at what's going on there. Those kind of techniques should be easy for anybody whose--

SPEAKER #2: Does that coincide with this first report up here where they're projecting thing up on the wall and storing them maybe like computer discs or tapes, could that be what they're doing, like here in this drawing #4, would that be like projecting the, I mean, of course they could be doing it for their own development too, it could go either way.

SPEAKER #1: Yeah, that's right, it could go either way. They could be photographing a device and projecting it up there for, then subsequent, no, drawing on those plastics sheets, for instance, to strip the--

SPEAKER #2: So this particular process here can be either way. There's nothing that says it would make it more one function than another.

SPEAKER #1: Right, for instance, this could be a quality control function, you know, or in prototype development to see whether they're etching technique to make all these little circuit lines was correct, you know whether it came up to

specification, which you would be doing, for instance, if you were making a chip, you know, to do something else. So it could go either way, there's no reason to indicate it be taking a device apart or doing the work to invent a device, it's just not clear. So those are my impressions.